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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte QIMING CHEN and MEICHUN SHU

Appeal 2016-002951
Application 13/418,055
Technology Center 2100

Before ST. JOHN COURTENAY III, ERIC FRAHM and
LINZY McCARTNEY, *Administrative Patent Judges*.

COURTENAY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134(a) from the Examiner’s Final Rejection of claims 1–20. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.¹

Invention

The disclosed and claimed invention on appeal is directed to a “Page Feed for Efficient Dataflow Between Distributed Query Engines.” (Title).

¹ Throughout this opinion, we refer to: (1) the Final Rejection, mailed Jan. 29, 2015 (“Final Act.”); (2) the Appeal Brief, filed June 25, 2015 (“App. Br.”); (3) the Examiner’s Answer, mailed Nov. 27, 2015 (“Ans.”); and (4) the Reply Brief, filed Jan. 25, 2016 (“Reply Br.”).

Representative Claim

1. A method of page feed for efficient dataflow between distributed query engines, comprising:

[L1] *storing a query result relation by a producer query [L2] as a page in a query engine buffer pool*, wherein each page stored in the query engine buffer pool is a data block of uniform size, wherein the query result relation comprises a plurality of results of the producer query;

sending the page to a distributed caching platform (DCP) as a data source of another query;

reading the query result relation by a consumer query from the page stored in the DCP.

(Contested limitations L1 and L2 are emphasized).

Rejections

A. Claims 1, 5–13, and 18–20 are rejected under pre-AIA 35 U.S.C.

§ 103(a) as being obvious over the combined teachings and suggestions of Marron (US 2003/0065874 A1, Apr. 3, 2003) in view of Chen (US 2004/0143562 A1, July 22, 2004).

B. Claim 2 is rejected under pre-AIA 35 U.S.C. § 103(a) as being obvious over the combined teachings and suggestions of Marron, Chen, and Dye (US 6,879,266 B1, Apr. 12, 2005).

C. Claims 3 and 4 are rejected under pre-AIA 35 U.S.C. § 103(a) as being obvious over the combined teachings and suggestions of Marron, Chen, and Copeland (US 2004/0073630 A1, Apr. 15, 2004).

D. Claims 14–17 are rejected under pre-AIA 35 U.S.C. § 103(a) as being obvious over the combined teachings and suggestions of Marron, Chen, and George (US 2011/0307736 A1, Dec. 15, 2011).

Grouping of Claims

Based on Appellants' arguments, we decide the appeal of rejection A of claims 1, 6–13, and 18–20 on the basis of representative independent claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv). We address rejection A of dependent claim 5 separately, *infra*. We address rejections B, C, and D, *infra*. To the extent Appellants have not advanced separate, substantive arguments for particular claims and/or limitations, or other issues, such arguments are considered waived. *See* 37 C.F.R. § 41.37(c)(1)(iv).

ANALYSIS

We have considered all of Appellants' arguments and any evidence presented. We disagree with Appellants' arguments, and we adopt as our own: (1) the findings and legal conclusions set forth by the Examiner in the action from which this appeal is taken, and (2) the findings, legal conclusions, and explanations set forth in the Answer in response to Appellants' arguments. (Ans. 3–12). However, we highlight and address specific findings and arguments for emphasis in our analysis below.

Rejection of Independent Claim 1 under 35 U.S.C. § 103(a)

We decide the following issues presented in this appeal:

Issues: Under § 103, did the Examiner err by finding the cited combination of Marron and Chen would have collectively taught or suggested contested limitations L1 and L2:

L1 — “storing a **query result relation** by a producer query” and
L2 — “as a **page** in a query engine buffer pool,”
within the meaning of claim 1? ² (emphasis added).

We find the first issue turns upon the broadest reasonable interpretation of the stored “**query result relation**” (limitation L1). The Examiner finds: “Marron discloses storing, sending, and reading query results, wherein the query results are stored as web information such as HTML pages in a query engine buffer pool (Marron: Paragraphs 50, 60, and 61).” (Final Act. 5–6).

Regarding contested limitation L1, Appellants contend, “the rejection failed to interpret the claim term *query result relation* using the broadest reasonable interpretation consistent with the Specification.” (App. Br. 6) (emphasis added). In support, Appellants (App. Br. 6) point to various examples in the Specification:

As used in the Specification, the term *query result relation* refers to a set of tuples that are returned as a result of a query. For example, the Specification states that “the **producer query stores the result relation as pages,**” and that “**the tuples in these pages** are in the format needed by the relational operators.” Specification, par. [0018] (emphasis added). Further, the Specification states that “an **external relation R is produced as a query result (e.g., **Select* into R from T**)** of a query executed on the producer QE. Next, whenever a new page p of the **external relation R is created and full with newly inserted tuples.**” Specification, par. [0042] (emphasis added).

² We give the contested claim limitations the broadest reasonable interpretation consistent with the Specification. *See In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). *Cf.* Spec. ¶ 71 (“It is noted that the examples shown and described are provided for purposes of illustration and are not intended to be limiting. Still other examples are also contemplated.”).

In contrast, the cited “HTML page” is not a set of tuples that are returned as a result of a query. Rather, an HTML page is simply a single page that is displayed in a web browser. As such, a person of ordinary skill in the relevant art, having read the Specification, would not interpret the claim term query result relation to refer to an HTML page.

(App. Br. 6).

However, we decline Appellants’ invitation to read limitations from the Specification into the claims.³ (See Examiner’s response, Ans. 3). Appellants fail to point to a definition in claim 1, or in the Specification, that would preclude the Examiner’s broader interpretation of “query result relation.” (Claim 1) (See Final Act. 6; Ans. 3). Because “applicants may amend claims to narrow their scope, a broad construction during prosecution creates no unfairness to the applicant or patentee.” *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) (citation omitted). Therefore, on this record, we are not persuaded the Examiner’s claim construction is overly broad, unreasonable, or inconsistent with Appellants’ Specification.

Regarding contested limitation L2, Appellants contend:

[A] review of the cited portions of Chen reveals that they say nothing whatsoever about a **query result relation**, much less storing a **query result relation as a page**. In fact, Chen as a whole appears to be entirely silent regarding storing any particular data object **as a page**. Rather, Chen describes something substantially different, namely a memory-based

³ See *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1346–47 (Fed. Cir. 2015) (“This court has repeatedly ‘cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification.’”) (quoting *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1328 (Fed. Cir. 2002)).

database system in which **all memory is managed** using units called “memory pages.” For example, Chen states that “[a] **memory page is the basic memory unit** of Memory Management.” See Chen, par. [0058] (emphasis added). A person of ordinary skill in the relevant art will readily appreciate that managing all memory using pages, as described in Chen, does not disclose or suggest that a **query result relation is stored as a page.**

(App. Br. 7).

In the Final Action (6), the Examiner relies, *inter alia*, on paragraph 58 of Chen, for teaching or suggesting contested limitation L2, “a **page** in a query engine buffer pool” (claim 1), as follows:

Referring to FIG. 4, the Memory Page Pool 149 includes the above contiguous MEM Page buffer herein the MEM Pages and MEM Nodes, and the four double linked lists (see FIG. 9 too). The Memory Page Pool includes both memory page (called MEM Page or MEM Page) and memory node (called MEM Node or MEM Node) management. A memory page is the basic memory unit of Memory Management with normally 1024, 2048 or 8192 bytes in each memory page, whereas a memory node is made from a memory page and is of a smaller size than a memory page.

(Chen, ¶ 58).

Given this evidence (*id.*), and the absence of a definition for “query engine buffer pool” in claim 1, or in the Specification, we are not persuaded the Examiner erred in finding Marron and Chen collectively teach or suggest contested limitation L2: “a **page** in a query engine buffer pool” (Claim 1).

Nor are we persuaded by Appellants arguments that the Examiner has improperly combined the references under § 103. Appellants contend, *inter alia*:

[T]he provided rationale is merely **circular logic**, namely that it would have been obvious to modify Marron to **include the memory-based database system of Chen** because this would create the **memory-based database system of Chen** (i.e., “to create a database engine completely in memory.”). It is submitted that such circular reasoning is not a valid rationale to explain why it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine Mehr and Sekhar in this particular manner.

...

Moreover, the provided rationale fails to provide any explanation or reasoning as to why this particular modification would have been seen as desirable or beneficial by a person of ordinary skill in the art. Rather, the provided rationale is a mere **conclusory statement** that does not provide **articulated reasoning with some rational underpinning** to support the legal conclusion of obviousness. Therefore, the provided rationale fails to conform to the rule of *KSR*.

(App. Br. 7–8).

The Examiner finds (Final Act. 6): “The motivation to combine Marron and Chen would be to create *a database engine completely in memory* to include the parsing and execution of queries by storing all data indexed, sorte[d] and searched based on selected search algorithms *in memory* (Chen: Abstract and Paragraph 13).” (emphasis added).

We note the Abstract of Chen expressly describes the advantage of a *memory-resident* database in terms of processing speed:

the processing speed of database query will take advantage of speed of RAM (Random Access Memory) without sacrifice any speed losing on Hard disk I/O. Not only the whole database is running in RAM, but also all or

pre-selected database table columns are default to be indexed. All internal processing of database query is based on indexed columns.

(Chen, Abstract) (emphasis added).

Given this evidence (*id.*), we find the Examiner provides sufficient articulated reasoning with some rational underpinning to establish why an artisan would have been motivated to combine Marron with Chen's memory-resident database system, i.e., to realize an improvement in database query speed. (Chen, Abstract). (*See* Final Act. 6).

Moreover, Appellants do not provide evidence sufficient to demonstrate that combining the teachings of Marron and Chen, as proffered by the Examiner (Final Act. 6), would have been "uniquely challenging or difficult for one of ordinary skill in the art," (*Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007)), nor have Appellants provided any objective evidence of secondary considerations, which our reviewing court guides "operates as a beneficial check on hindsight." *Cheese Systems, Inc. v. Tetra Pak Cheese and Powder Systems, Inc.*, 725 F.3d 1341, 1352 (Fed. Cir. 2013).

On this record, we find the Examiner's proffered combination of the respective teachings of Marron and Chen would have merely yielded predictable results, and thus would have been obvious to an artisan possessing an ordinary level of skill at the time of Appellants' invention. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) ("The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.").

For at least the aforementioned reasons, and based upon a preponderance of the evidence, we do not find persuasive Appellants'

arguments alleging the Examiner has improperly combined the references under § 103. (App. Br. 7–8).

Because Appellants have not persuaded us the Examiner erred, we sustain rejection A of representative independent claim 1, and rejection A of the associated grouped claims, which fall with claim 1. *See* Grouping of Claims, *supra*.

Rejection A of Dependent Claim 5

Claim 5 recites: “The method of claim 1, further comprising selecting page size to balance efficiency of access to the DCP and query processing.”

Regarding the rejection of claim 5, Appellants contend:

[C]laim 5 recites “*the method of claim 1, further comprising **selecting page size to balance efficiency of access to the DCP and query processing***” (emphasis added). The rejection asserted that this subject matter is disclosed by par. [0161] of Marron and par. [0055], [0058] and Figs. 4-8 of Chen. See Office Action, pp. 6-7.

Appellant respectfully disagrees. Specifically, a review of the cited par. [0161] of Marron reveals that it says nothing whatsoever about either *page size or balancing efficiency*, much less “*selecting page size to balance efficiency of access to the DCP and query processing*,” as included in claim 5.

Further, a review of the cited portions of Chen reveals that they say nothing whatsoever regarding **balancing efficiency of access to the DCP and query processing**. In fact, a search of Chen as a whole reveals that it is entirely silent regarding about this subject matter.

(App. Br. 9).

The Examiner disagrees:

Marron in Paragraph 161 discloses the storage requirements for caching and in Paragraph 162 discloses overhead associated with size of data and the tradeoff between cache representation and the additional querying capabilities.

Chen in Paragraphs 55 and 58 discloses calculating total memory size, page size among various page sizes, and the number of pages and allocating all memory of the targeted total memory size.

Calculating a tradeoff between data size representing a cached and querying capability of a distributed caching system is balancing efficiency of access to the DCP and query processing. Calculating a page size and memory size to allocate all memory of the targeted memory is selecting page size to balance access.

Therefore, the combination of Marron and Chen discloses the argued feature “selecting page size to balance efficiency of access to the DCP and query processing”, as disclosed in dependent claim 5.

(Ans. 11).

We note Marron (¶ 162) describes a “*reasonable tradeoff*” between greater overhead in terms of a larger cached file size (e.g., “2.8 times that of the original size of the file”), and “additional querying capabilities.” (emphasis added). Thus, we find Marron (*id.*) teaches or suggests “to *balance efficiency* of access to the DCP [(Distributed Caching Platform)] and *query processing*,” within the meaning of claim 5. (See Ans. 11: “Marron in Paragraph 161 discloses the storage requirements for caching and in Paragraph 162 discloses overhead associated with size of data and the tradeoff between cache representation and the additional querying capabilities.”

As explained by the Examiner (Ans. 11), Chen describes allocating memory page size (¶55), which is further described in ¶ 58:

The Memory Page Pool includes both memory page (called MEM Page or MEM Page) and memory node (called MEM Node or MEM Node) management. A memory page is the basic memory unit of Memory Management with normally 1024, 2048 or 8192 bytes in each memory page, whereas a memory node is made from a memory page and is of a smaller size than a memory page.

(Chen, ¶ 58). (See Final Act. 7).

We note the Examiner's rejection of claim 5 is based on the *combined* teachings and suggestions of Marron and Chen.⁴ Given the evidence relied upon by the Examiner (Final Act. 7; Ans. 11), on this record, Appellants have not persuaded us of error regarding the Examiner's legal conclusion of obviousness.

Accordingly, we sustain rejection A of dependent claim 5.

Rejections B, C, and D of Remaining Claims

To the extent Appellants have not advanced separate and substantive arguments regarding the rejections of the remaining dependent claims on appeal, such arguments are considered waived. *See* 37 C.F.R. § 41.37(c)(1)(iv). (*See* App. Br. 9–11).

⁴ “[T]he question under 35 U.S.C. § 103 is not merely what the references expressly teach but what they would have suggested to one of ordinary skill in the art at the time the invention was made.” *Merck & Co., Inc. v. Biocraft Laboratories, Inc.*, 874 F.2d 804, 807–808 (Fed. Cir. 1989), cert. denied, 493 U.S. 975 (1989); *see also* MPEP § 2123(I).

Reply Brief

To the extent Appellants may advance new arguments in the Reply Brief not in response to a shift in the Examiner's position in the Answer, we note arguments raised in a Reply Brief that were not raised in the Appeal Brief or are not responsive to arguments raised in the Examiner's Answer will not be considered except for good cause. *See* 37 C.F.R. § 41.41(b)(2).

Conclusion

For at least the aforementioned reasons, we find a preponderance of the evidence supports the Examiner's underlying factual findings and ultimate legal conclusion of obviousness regarding all contested issues on appeal.

DECISION

We affirm the Examiner's rejections of claims 1–20 under 35 U.S.C. § 103(a).

No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. § 41.50(f).

AFFIRMED